Comparison of the Effects of Two Models of RN Led Post-Discharge Care for Stroke Patients

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Abstract

Stroke causes a significant health burden for the patient who experiences a stroke and for their family and caregivers. Individuals who experience a stroke are often left to cope with severe disabilities that can impact the quality of life of the individual and their family. The Centers for Medicare and Medicaid Services, as well as many national quality organizations, has identified improving transitions in care as a priority. Improving the transition of stroke patients from hospital to home can have a positive impact on patient outcomes and long term function.

Purpose: The purpose of this project was to conduct an exploratory proof-of-concept feasibility study comparing two models of RN led post-discharge care for stroke patients. The models were evaluated based upon effectiveness and cost. Effectiveness was measured by the patient's satisfaction with transition using the Care Transition Measures-3 (CTM-3), use of the emergency department, readmission for any reason, and the number of identified medication discrepancies and home safety issues. Cost was evaluated by a comparison of the actual staff costs between the two interventions. Readmission rates and changes in satisfaction were compared with historical data for the facility.

Question: In acute stroke patients post discharge, which is most effective: a follow up phone call by an RN or a home visit by an RN in reducing all cause hospital readmissions and emergency department use, and enhancing the patient's satisfaction with the quality of the care transition at 30 days after discharge?

Site: The facility where the project took place is certified as a Primary Stroke Center by the Joint Commission, caring for approximately 120 acute stroke patients yearly. Patients discharged from an acute care unit or the inpatient rehabilitation unit to a non institutional setting and who had a Functional Independence Measure (FIM ™) cognitive score indicating the need for minimal assistance, were asked to participate in the study.

Findings: The number and types of issues with medication reconciliation and safety in the home were recorded during the RN phone call or RN home visit within four days of discharge. Readmission, use of the emergency department and patient satisfaction were assessed 30 – 35 days after discharge.

The results of the project demonstrated the feasibility of pursing a future randomized controlled trial to address the effectiveness of each of the two models of RN-led post-discharge care as compared to usual care, which does not have an RN-led post discharge intervention.

Chapter One: Nature of the Project

The Problem

In the United States, approximately 780,000 strokes occur each year of which 180,000 (23%) are recurrent (Summers et al., 2009). Stroke is the fourth leading cause of death in the U.S. following heart disease, malignant neoplasm and chronic lower respiratory disease (Hoyert & Xu, 2012). Stroke is the abrupt onset of a neurological deficit due to either an occluded artery or the rupture of a blood vessel in the brain leading to ischemia. Ischemia in the brain leads to infarction or death of neurons if circulation is not restored quickly; neuronal death occurs within 4 – 10 minutes if cerebral blood flow is zero (Smith, English, & Johnston, 2008). The majority of strokes (87%) are caused by ischemia, 10% are due to intracranial hemorrhage and 3% are due to subarachnoid hemorrhage (Summers et al., 2009).

Stroke causes a significant health burden for patients and for their family and caregivers. The estimated direct and indirect cost of stroke in 2010 was $73.7 billion (American Heart Association, 2010). Individuals who experience a stroke are often left to cope with severe disabilities; stroke is the leading cause of functional impairment with 20% of survivors needing institutional care after three months and 15 – 30% being permanently disabled (Goldstein et al., 2006). Data from the Framingham Heart Study showed that 34% of women and 16% of men remained disabled six months after experiencing a stroke (American Heart Association, 2010). There is a need for more efficient and effective management of strokes across all phases of stroke care from the hyperacute phase through the transition home.

The transition from hospital to home is a critical period. A successful transition of care is defined as, "a set of actions designed to ensure the coordination and continuity of health care as patients transfer between different locations or different levels of care within the same location." (Coleman & Boult, 2003, p. 556). Best practices for successful transition suggest that specific interventions can reduce avoidable re-hospitalizations. These interventions include: "improving discharge planning and transition processes out of the hospital; improving transitions and care coordination at the interfaces between care settings; enhancing coaching, education, and support for self-management; redesigning primary care; and providing supplemental services for patients at high risk of recurrent hospitalization." (Rutherford,

Nielsen, Taylor, Bradke, & Coleman, 2011, p. 3). Successful transition is best achieved when patients are knowledgeable about their medical condition, understand how to take their medications and understand their follow up plan of care *(Reducing hospital readmissions with enhanced patient education. 2010)*. Despite efforts on the part of the hospital care team, the transition from hospital to home is not always successful, with 19.6% of Medicare patients returning to the hospital for a re-admission within 30 days of the index hospitalization (Jencks, Williams, & Coleman, 2009).

After discharge from the hospital, 49% of patients are reported to have at least one medical error either in continuity of care, diagnostic work up or follow up (Moore, Wisnivesky, Williams, & McGinn, 2003). Adverse drug events (ADE) are the most common cause of adverse events post discharge and most of these occur because of a breakdown in communication between the hospital and post acute care provider (Kripalani, Jackson, Schnipper, & Coleman, 2007). Completing a detailed medication reconciliation at discharge is one mechanism to help prevent ADEs.

Obstacles to a successful transition include insufficient preparation and education of the patient and family prior to discharge and lack of community or family support for the patient at home. These obstacles may lead to the patient's lack of understanding of post discharge needs. Such issues are intensified for patients who are older, have chronic diseases and complex care needs (Coleman et al., 2004).

Patients who have experienced an acute stroke have been identified as having complex medical and social needs and are at risk for an ineffective transition of care (Olson et al., 2011). In detailed post discharge interviews with stroke patients and their families were conducted at the study site. During those interviews, patients and family members identified that a follow up home health nurse visit would have been helpful. One family member stated that they would have liked this to, "make sure I was doing everything right." This need was identified independently by the families. Safety needs have been identified as the area of greatest concern for caregivers in the first month after stroke patients are discharged home (Grant, Glandon, Elliott, Giger, & Weaver, 2004). There is a demonstrated need to have

an effective, consistent approach to stroke patients' transition from the acute care hospital (acute unit or rehabilitation unit) to home.

The Purpose

The purpose of this project was to evaluate the effectiveness of two options for evidence-based approaches to the transition of stroke patients from an acute care or rehabilitation unit to home. The two models were evaluated based upon effectiveness and cost. Effectiveness was measured by patient and family satisfaction with the transition, hospital readmission rates, and emergency department use rates. The number of medication reconciliation or home safety issues identified by the RN during the post discharge phone call or home visit was tracked. Cost was evaluated by a comparison of the actual cost of staff time for each intervention. A variety of agencies have developed programs to improve the quality of the care transition such as Project RED, BOOST and STAAR (Rutherford et al., 2011). These programs served as the foundation for the design of the discharge process for this project.

Significance to Nursing, Healthcare and Consistency with the DNP Essentials

This project is significant to nursing practice and healthcare because of the critical nature of the transition of patients from one healthcare setting to another. The time of transition to home is a crucial one with significant opportunities for failure, resulting in harm to the patient. Patient education, discharge planning and development of a transition plan are frequently the nurse's responsibility to coordinate. The process of educating patients to prepare them for discharge is complex and has been negatively impacted by shorter lengths of stay and higher levels of patient acuity at discharge (Chugh, Williams, Grigsby, & Coleman, 2009). Although nurses understand the importance of patient education and a comprehensive discharge plan, the reality is that inadequate training of staff on teaching methods, poor transmission of information and inadequate time for patient teaching create a process that is often ineffective (Flacker, Park, & Sims, 2007).

The need to develop better transition mechanisms has been recognized by diverse groups such as The Joint Commission (TJC), the Society of Hospitalist Medicine (SHM), the Agency for Healthcare Research and Quality (AHRQ) and the National Quality Forum (NQF). In addition, the Medicare

inpatient prospective payment system (IPPS) is reducing hospital payments to facilities that have higher than expected rates of readmission (Averill et al., 2009). There is an imperative to improve the transition process both from a process of care perspective and from a financial perspective.

This project reflects practice essentials for the Doctorate of Nursing Practice (DNP) degree. The essentials speak to the DNP's focus on integrating scientific knowledge into practice in order to improve patient care. This project, focused on improving the transition of the patient home, combines the implementation of new delivery methods based on scientific evidence, the translation of research into practice and the dissemination and integration of new knowledge. The use of data to impact practice, a focus on the education and follow-up of patients with complex health conditions, and the implementation of an intervention to improve outcomes squarely fit within the Essentials of DNP practice (American Association of Colleges of Nursing, 2006; Chism, 2010).

Project Objectives

The purpose of this project was to conduct a comparative proof-of-concept feasibility study of two evidence based RN-led methods of home transition for patients with a diagnosis of stroke. The objectives of the project were to:

1. Determine if a structured home visit by a Home Health RN: decreases readmission to the hospital and use of the emergency department, improves patient satisfaction with the transition home and identifies medication discrepancies and home safety issues.
2. Determine if a structured phone call by a Home Health RN: decreases readmission to the hospital and use of the emergency department, improves patient satisfaction with the transition home and identifies medication discrepancies and home safety issues.
3. Determine if there are any difference in effectiveness, cost, and identification of medication discrepancies and environmental safety issues associated with the home visit versus the phone call follow up.

Each registered nurse-led intervention included: reinforcement of stroke education, review of homegoing instructions, review of when to contact their primary care provider or go to the emergency

department, confirmation of follow-up appointments, review of pending test results, a detailed medication reconciliation and a home safety assessment. The success of the registered nurse-led transition process was measured in terms of the patient's readmission rate and rate of use of the emergency department within the first thirty days after discharge, the patient's satisfaction score on three questions in the Care Transition Measures – 3 (CTM-3) developed by Coleman, et al. (2002) and the number of medication discrepancies and home safety issues identified.

Chapter Two: Review of Literature

Related Research

Introduction.

The development of this project required the synthesis of multiple areas of literature. They include data regarding the transition of stroke patients from hospital to home, care strategies proven to aid in successful transition to home and characteristics of patients experiencing a poor transition home. This review also includes studies evaluating the use of post discharge phone calls and home visits, the cost of hospital readmission, the nature and challenges of medication reconciliation, and assessment of home safety.

Challenges for the stroke patient in the Transition to Home

After treatment and stabilization during the hyperacute phase of stroke care, patients move into the acute phase. During the acute phase, monitoring and interventions to prevent and deal with the sequelae of stroke are emphasized, and discharge planning begins. Discharge planning is critical in assuring a successful transition to home. The National Institute for Neurological Disorders and Stroke reports that only 30% of stroke survivors recover almost completely, 40% require subacute care, 10% require institutional care and 15% expire shortly after the stroke (Summers et al., 2009). Additionally, up to 74% of stroke survivors will require assistance and care by family members and 14% will suffer another stroke within one year (Summers et al., 2009). With such a large percentage of stroke patients requiring assistance and the risk of a repeat event, optimizing their care, and having a successful transition to home are critical.

Stroke patients have complex chronic health conditions and are at risk for “bounce-backs”, defined as movement from a less intense to a more intense care setting soon after discharge (Kind, Smith, Pandhi, Frytak, & Finch, 2007). In a study by Kind et al. (2008), up to 20% of stroke patients experienced one bounce back and 16% had two or more bounce backs. With each additional move to a higher level of care, the patient’s survival to one year decreased significantly. If the patient experiences no bounce backs, survival at one year was 83%. With one bounce back, survival decreased to 67% and

with two or more bounce backs, survival decreased to 55% (Kind et al., 2008). The impact of an unsuccessful transition home for the stroke patient is significant, highlighting the need for standardized care to assure a safe and successful transition from the hospital. In this study, the authors identified that patients most at risk for bounce-back were African American, on Medicaid, had a higher acuity, higher levels of poverty, and lower levels of post secondary education (Kind et al., 2008).

The Centers for Disease Control and Prevention requested that AHRQ's Evidence-based Practice Center complete a systematic review of literature to determine what evidence is available regarding transition of care programs or services for patients after a stroke or acute myocardial infarction. The goal of the review was to determine if there was evidence to support specific strategies for coordinated transition of care services for post-acute patients hospitalized after a first incidence of stroke or myocardial infarction (Olson et al., 2011). The review identified four intervention categories for transitioning the patient from the hospital to the community. The interventions, identified by type, were: (a) hospital initiated support for discharge to home or post acute care, (b) hospital or community based educational interventions for the patient or family, (c) community based support of the patient and family, and (d) chronic disease management.

The results of the review were disappointing. There were no clearly defined interventions that improved the transition of care from hospital to home. There was limited evidence supporting interventions identified as hospital initiated support at discharge, and no transition of care interventions that improved functional recovery, quality of life or psychosocial factors such as strain of care, anxiety or depression (Olson et al., 2011). Of the 44 studies included, the major limitations were an inadequate sample size, variability in the outcomes measured and absence of a description for the usual care group. In addition, many of the studies were conducted outside of the United States and in healthcare systems very different from the U. S. (Olson et al., 2011).

The authors offered suggestions for future research including the need for clearly defined intervention and outcome measures, consistency in the terms used and the identification of outcomes which are responsive to the interventions being tested. A lack of data on the optimal method for stroke

education and the benefit of such education to the patient and family were noted as well as a lack of information on how to optimize patient health care education to cause modification of the patient's behavior.

Plans for successful transition of care.

Improving the transition of care from the hospital to the community has been the focus of research leading to the development of specific plans for the transition of care. The success of a transition from hospital to home is adversely impacted by failures to: share patient data with the next caregiver; follow up on pending test results; and assure the patient comprehends new self care needs, including medications and complex discharge instructions (Jack et al., 2009; Kripalani et al., 2007). Programs to improve transition include the Re-Engineered Discharge Process (RED), Better Outcomes for Older Adults through Safe Transitions (BOOST), Hospital 2 Home (H2H), State Action on Avoidable Re-hospitalizations (STAAR) and the Care Transitions Intervention (CTI). All have similar components which can be grouped into four key overarching recommendations for implementation (Rutherford et al., 2011):

1. Perform an enhanced assessment of post-hospital needs
2. Provide effective teaching and facilitate enhanced learning
3. Ensure post-hospital care follow up
4. Provide real-time handover communication

The Reengineered Discharge Process (RED) has been selected as the framework for improving the discharge process in the facility where this project took place. There are three core components of RED: a discharge advocate who coordinates the transition plan and education, an After Hospital Care Plan (AHCP) and a follow up telephone call. Implementation of these components decreased hospital use (both emergency department and readmission) by 30% for general medical patients in an urban, academic medical center setting (Jack et al., 2009). The hospital where this project took place has implemented RED for all discharges to home by using staff nurses to coordinate the transition plan and education. Unit secretaries make post discharge appointments for patients. Staff nurses complete the components of the

AHCP and review it with the patient prior to discharge. The hospital, at the time of this project, had not yet implemented the post discharge phone calls.

Post acute structured telephone interventions and home visits.

Methods to improve the transition of patients include post-discharge phone calls by a registered nurse or nurse home visits. The literature contains studies supporting telephone follow up after discharge from acute care and patient support interventions that use home visits. A review of the literature did not identify any studies in which the effectiveness of a structured home visit was compared to the effectiveness of a structured phone call.

Early research evaluating the effectiveness of telephone follow up in improving outcomes was undertaken because of concerns regarding inadequate communication between hospital and community caregivers (Turner, 1996). In Turner's study (1996), patients were phoned 24 hours after being discharged to home. The call was very basic, including data on who the caller reached, how the patient was feeling, any identified problems or concerns and any instructions given or actions taken. The calls were placed by the nursing staff on the discharging unit. The author cites earlier work that had used telephone call backs to provide help and assistance including reinforcing patient education and as a means of improving practice (Turner, 1996). The author noted that patients and their caregivers were positive about the call and that the nurse callers were able to identify health related and social problems, offer advice or take action.

A systematic review examined literature from multiple databases through 2003 for telephone follow up (TFU) interventions (Mistiaen & Poot, 2006). The authors' included studies where the TFU occurred within the first month after discharge with outcomes measured within 3 months. Overall, no statistically significant differences were appreciated between the groups that had a TFU versus control. No studies identified any negative results of the intervention. The authors noted that because of the variety of methods used and outcome measures tracked, the results should be interpreted with caution and that no clear conclusions can be made. They also note that some studies had favorable results and others showed clinically equivalent results (Mistiaen & Poot, 2006). The authors of this review note that TFU is

viewed positively as a mechanism to provide information to patients, advice with symptom management, recognition of complications and support after discharge.

Several studies postulated the benefits of telephone follow up calls with two demonstrating significant improvements in patient satisfaction based on TFU (Braun, Baidusi, Alroy, & Azzam, 2009; Setia & Meade, 2009). In the study by Braun, et al., (2009), follow-up phone calls were placed at one week and one month post discharge. The authors demonstrated a 6 – 12% improvement in patient satisfaction, across five measures, when patients were interviewed three months after discharge (Braun et al., 2009). The authors noted that in this study of 400 patients, there was a non significant trend indicating fewer readmissions among patients with the TFU intervention.

In another study, a large university affiliated medical center implemented a post-visit follow up phone call for emergency department (ED) patients and inpatients. The facility noted significant differences in the Press Ganey patient satisfaction scores on the question, "instructions /information given about caring for yourself at home" between patients who had a post-visit call and those who did not have a call. For four consecutive quarters during 2006 - 2007, the facility demonstrated satisfaction with the instructions / information question at the 95th to 99th percentile for patients receiving a call versus the 20th to 46th percentile for those who did not (Setia & Meade, 2009). Neither of these studies details what information was discussed with the patient during the TFU intervention nor if the intervention was purposeful and structured.

A similar experience in improvement in patient satisfactions scores was noted when structured phone calls were initiated post discharge from the emergency departments at ten hospitals in the Baylor Health Care System. The calls were structured with questions on four topics: discharge instructions, medications, symptoms, and initiating follow-up appointments with their physician (Cochran, Blair, Wissinger, & Nuss, 2012). The authors found that of 9,240 patient contacts, 1,041 interventions were required with some patients receiving more than one intervention. A breakdown of the interventions showed that 34% were related to clarifying medication or home care instructions, 30% for assistance with

referrals or reminders for follow up appointments, 33% were instructed to return to the ED or contact their physician for unresolved or new symptoms and 3% required immediate escalation of care (Cochran et al., 2012). Patient satisfaction for one facility (Garland) was reported and demonstrated an increase in mean score for "likelihood to recommend" from 80.1 to 86.5 in the period from April of 2010 to March of 2011.

Telephone follow up, as a mechanism to improve outcomes and improve satisfaction, has been undertaken in a variety of disease specific patient populations. One facility used a nurse coached telephone intervention for patients undergoing arthroscopic surgery (Jones, Duffy, & Flanagan, 2011). Staff nurses delivered the intervention to outpatients via a telephone call on the evening of surgery and then at 24, 48 and 72 hours after surgery. The calls were purposeful, evaluating the patient's response to surgery, managing symptoms and setting expectations regarding outcomes. The calls ranged from 5 to 30 minutes and used set questions and guidelines. This structured intervention demonstrated that patients who received the intervention had significantly less symptom distress at 72 hours and one week after surgery. The intervention group also demonstrated better overall physical and mental health one week after surgery as compared to the usual practice group (Jones et al., 2011).

A systematic review comparing structured telephone support versus telemonitoring programs for chronic heart failure (CHF) patients reinforced that both of these interventions can provide specialized care to patients with limited access to care (Inglis et al., 2010). The study concluded that while the meta analysis of studies demonstrated a non significant positive effect on mortality by structured telephone support, telemonitoring demonstrated a statistically significant effect. In those patients receiving structured telephone support and telemonitoring, all cause mortality was decreased by 12% (Inglis et al., 2010). Studies using any in the home nursing or CHF specialists were excluded.

Literature on in home follow up for discharged patients is less plentiful than that for post care phone follow up. Comprehensive discharge planning by advance practice registered nurses (APRNs) for the elderly demonstrated positive outcomes (Naylor, Brooten, Campbell, Jacobsen, Mezey, Pauly, & Schwartz, 1999). The APRNs visited every 48 hours while the patient was hospitalized and developed a

standardized, comprehensive, individualized discharge plan and home follow up protocol. After discharge, APRNs visited patients, at a minimum, within 48 hours and at 7 – 10 days after discharge. The intervention demonstrated statistically significantly decreased readmission rates, fewer hospital days and increased time to first readmission. The study failed to demonstrate any difference in post discharge acute care visits, functional status, depression or patient satisfaction (Naylor, et al., 1999). This study demonstrated positive effects. Replicating this model may not be feasible for all facilities due to the staff costs and access to APRNs.

In another study, staff nurses completed an in department assessment for elderly patients discharged from the emergency department (ED) during day hours (8 A.M. – 8 P.M.). For patients discharged from ED between 8 P.M. – 8 A.M., a nurse completed the same assessment in the patient's home within 24 hours of discharge. The nurse discussed the case with the patient's primary care provider, developed a care plan, and initiated urgent interventions and referrals (Caplan, Williams, Daly, & Abraham, 2004). A multidisciplinary group reviewed these cases to elicit further suggestions regarding intervention and care. Interventions, often undertaken by the team members, and ongoing reviews were carried out for four weeks, at which time the patients were transferred out of the program. Patients were followed for 18 months and those in the intervention group had an average of 1.65 new problems identified and received 2.29 home visits. The intervention group demonstrated statistically significant fewer total admissions in the first 30 days and fewer patients admitted emergently to the hospital during the 18 month follow up period. The intervention group had more patients visit their primary care provider, the ED and outpatient clinics, but the number was not statistically significant (Caplan et al., 2004). This intervention demonstrated that targeted screening, a transition plan and the use of home visits when needed moved patient care to lower cost settings and kept them from using high cost settings, such as the emergency department and inpatient care.

Cost of hospital readmission.

Hospital readmissions have been identified as a measure of poor care or missed care coordination opportunities (Hackbarth, Reischauer, & Miller, 2007). The cost of unplanned rehospitalization in 2004

was $17.4 billion with 19.6% of patients discharged from the hospital rehospitalized within 30 days (Jencks et al., 2009). In their report to Congress in 2007, the Medicare Payment Advisory Commission (Medpac) noted that readmission to a hospital within 30 days of discharge accounted for $15 billion in spending (Stone & Hoffman, 2010). Rehospitalization has been identified as an area for improvement to lead to decreased costs. Factors associated with hospital readmission include: use of high risk medications; use of five or more medications; and the presence of specific chronic clinical conditions such as advanced chronic obstructive pulmonary disease, diabetes, heart failure, stroke and depression (Jack et al., 2009).

The Patient Protection and Affordable Care Act (PPACA) is comprehensive health care reform legislation that was signed into law in 2010. Changes to the system include pay-for-performance incentives and take aways, bundled payments of several different varieties and patient warranties (Stone & Hoffman, 2010). Part of the legislation decreases payments to hospitals based upon readmission rates beginning October 1 of 2012. The law targets three high readmission DRG's with additional DRGs to be added in 2015. A weighted method, the Potentially Preventable Readmission (PPR), established which readmissions were potentially preventable (Stone & Hoffman, 2010; Averill et al., 2009). Applying the methodology to 2005 Medicare data, 84% of 7-day readmissions, 78% of 15-day readmissions and 76% of 30-day readmissions were potentially preventable (Stone & Hoffman, 2010). According to Averill (2009), admissions are considered potentially avoidable if they could have been prevented by one of the following:

1. Adequate quality of care in the index hospital admission
2. Adequate discharge planning
3. Adequate post-discharge follow up
4. Improved coordination between the inpatient and outpatient health care teams

Currently, there are no incentives to hospitals to improve the process of transition from hospital to home; however, changes to Medicare are creating a financial reason for hospitals to improve the transition process (Stone & Hoffman, 2010).

Medication reconciliation and identification of discrepancies.

At the time of hospital discharge, patients may be expected to assume self management with limited support and preparation (Coleman & Berenson, 2004). After discharge, 49% of patients experience at least one medical error and 19% - 23% of patients have an adverse drug event (Kripalani et al., 2007). In an effort to have more effective care transitions, The Joint Commission requires hospitals to accurately and completely reconcile medications at transitions of care.

At transition points such as discharge, medication errors may be due to an incomplete or inaccurate admission reconciliation, changes in the regimen during hospitalization that are not incorporated, substitution of one medication for another due to having a closed formulary, and changes from long to short acting formulations (Kripalani et al., 2007). In a study of elderly hospitalized patients, investigators discovered that 40% of all admission medications were discontinued and 45% of all medications at discharge were new. Patients who may need additional counseling or intervention in medication reconciliation include those that have limited literacy, are taking more than five medications daily or are on high risk medications (Kripalani et al., 2007).

After discharge, patients must manage their medications until they see their primary care provider which may not occur for several days or weeks. If the patient is taking a medication incorrectly, is missing a medication or is taking a medication that has been discontinued, the error can have a significant impact. In one study, 19% of discharged patients had an adverse event within three weeks of discharge. Sixty percent of these adverse events were adverse drug events (Forster, Murff, Peterson, Gandhi, & Bates, 2003).

Medication discrepancies, which are potential errors, can take many forms. One study demonstrated that 14.1% of patients had one or more medication discrepancies with 62% of these having one, 25% having two, 8% having three and 5% with four or more discrepancies (Coleman, Smith, Raha, & Min, 2005). Patients who had discrepancies were taking an average of 9 medications; patients without a discrepancy averaged 7.1 medications (Coleman et al., 2005). In categorizing the medication errors, 50.8% were related to patient factors such as non intentional non adherence, not filling the prescription

and financial barriers. System associated factors accounted for 49.2% of the discrepancies and were due to issues such as incomplete discharge instructions, conflicting information from different sources and duplication of an individual medication or unnecessarily taking two medications for the same purpose (Coleman et al., 2005).

Safety concerns.

Stroke patients are at risk for safety issues related to their home environment. The American Stroke Association recommends an assessment of the home environment to identify potential safety issues and help modify them as the patient transitions to home (Summers et al., 2009). For stroke patients, environmental needs change and environmental modifications may be needed (Reid, 2004). Home health nurses identified the prevention of falls / hazards as the second most important teaching need for stroke patients (Pierce, Rupp, Hicks, & Steiner, 2003). Family members who were the caregivers of stroke patients also identified safety as an area of concern. In a study evaluating these caregivers' primary problem and concerns for the first four weeks after transition home, safety was the number one concern each week (Grant et al., 2004). Unsafe environments, characterized by tripping hazards, difficulty maneuvering through doorways or hallways with an assistive device because of structural barriers, or clutter put patients at risk for falls. Assessment and modification of hazards in the home may help to keep patients safe.

Measuring satisfaction with transition.

Increased attention to patient satisfaction with care is evident in the Institute of Medicine report, Crossing the Quality Chasm: A New Health System for the 21st Century and the measurement of patient satisfaction undertaken on a federal level by the Hospital Consumer Assessment of Health Plan Survey (HCAHPS) (Coleman, Mahoney, & Parry, 2005; Committee on Quality of Health Care in America & Institute of Medicine, 2001). HCAHPS data are publicly available for comparison between facilities and is a component of Value Based Purchasing (VBP). Instituted as part of the Patient Protection and Affordable Care Act (PPACA), VBP reduces the base DRG payment to hospitals and gives them the opportunity to recoup the lost funds and earn bonuses by performing well on key indicators. Currently,

patient satisfaction accounts for 30% of the measures evaluated (Henry J. Kaiser Family Foundation, 2011). The transition of care from hospital to home is part of what is measured by HCAHPS. One component of VBP gives hospitals a financial incentive to ensure patients have a smooth and successful care transition home including satisfaction and reducing excessive readmissions (Focus on overall quality to succeed under value-based purchasing. 2012).

Evaluation of effectiveness of the intervention.

As highlighted by Olson et al., (2011), current research studies have not consistently defined the interventions and outcomes being measured in the transition of stroke patients from hospital to home. Measurements used for this project were: readmission for any reason or use of the emergency department within 30 days, and satisfaction of patients and their caregivers using the Care Transitions Measures-3 tool. The Centers for Medicare and Medicaid Services (CMS) uses readmission as a measure of successful transition and identifies readmissions as indicators of poorer quality and increased costs (Averill et al., 2009; Jencks et al., 2009). The measures used for this project were clearly defined and met the need for the use of a consistent, recognized measure as identified by Olson, et al. (2011). In addition to these outcome measures, data on patient responses to the structured questions used during the visit or the follow-up phone call were collected.

Theoretical Framework

The theoretical framework for this project was the Clinical Scholar Model. This model promotes staff nurses integrating research into clinical practice. The model was inspired by the words of Dr. Janelle Krueger, the philosophy and process used in the Conduct and Utilization of Research in Nursing Project, Everett Roger's Diffusion of Innovation Theory, and Sigma Theta Tau's Clinical Scholarship Resource paper (Melnyk & Fineout-Overholt, 2011; Strout, Lancaster, & Schultz, 2009). The Clinical Scholar Model promotes the spirit of inquiry via a step-wise process. The model takes a process or outcome that is identified for improvement and walks it through a series of sequential steps from problem identification to implementation and evaluation.

The initial step in the model is the identification of the problem through observation and reflection. After the problem is identified, a clear and concise research question is written. Next, review, analysis and critique of the literature takes place with the goal of identifying salient outcomes that answer the clinical question. The most critical step in the process is synthesis of the literature together with facility data to determine recommendations for practice change. If the results of the synthesis are strong enough to indicate a specific change in practice, the evidence based practice project proceeds.

The evidence based practice project applies findings from a search of the literature and knowledge based upon internal evidence. The project is implemented on a pilot unit or with a pilot population. Measurable outcomes are monitored and evaluated for actual changes and improvements in specific patient outcomes. Finally, the project is evaluated and improved upon, and ultimately implemented on a widespread basis, replacing old practices with the new practice. The model is illustrated in Figure 1.

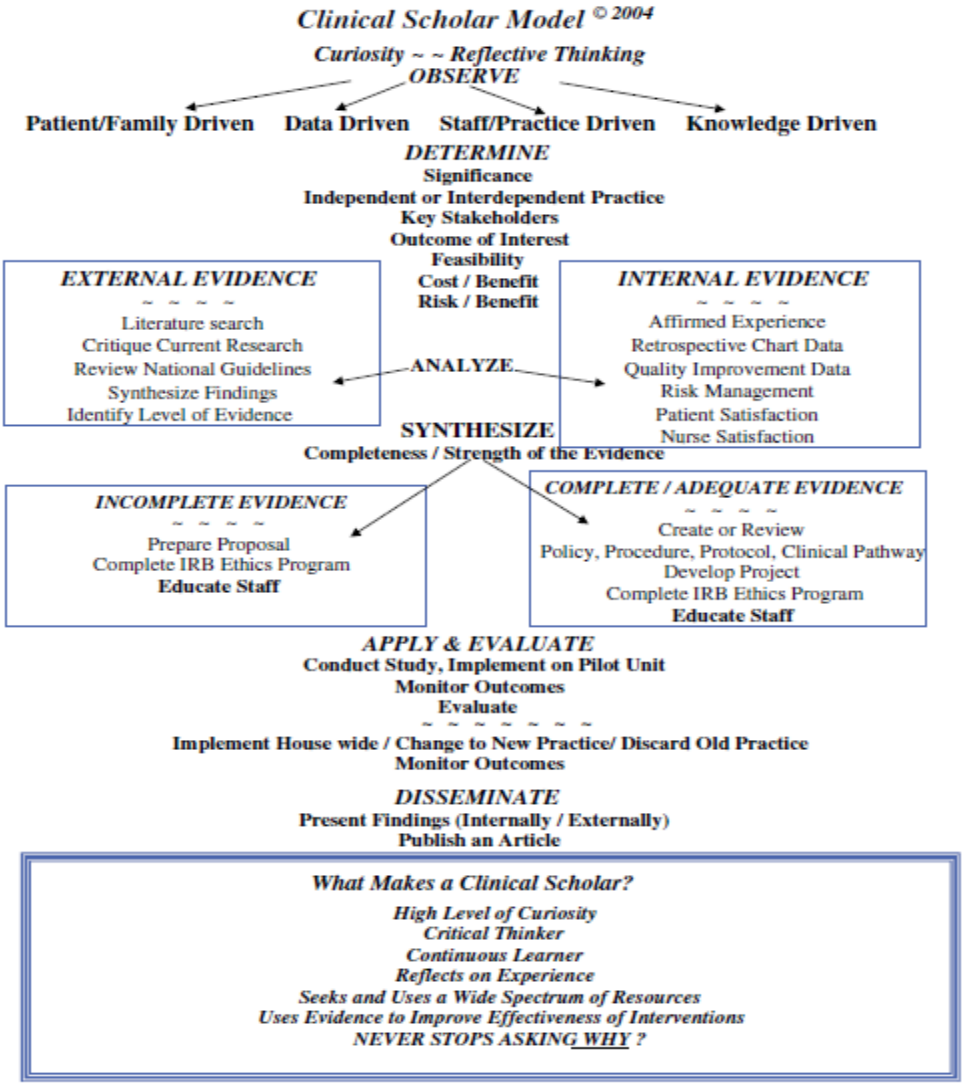

Figure 1. Clinical Scholar Model. (Courtesy of Alyce A. Schultz RN, PhD, FAAN, Chandler, AZ.)

Chapter 3: Methods

Project Design

This project was a comparative proof-of-concept feasibility study of two models of RN led post-discharge care for stroke patients. The project evaluated the patient's satisfaction with transition to home, use of the emergency department or readmission for any reason within 30 days of discharge. The setting for this project was a 150 bed, independent, community hospital categorized by CMS as a rural referral center in North-Central Ohio. The organization has been accredited by the Joint Commission as a Primary Stroke Center since 2010 and discharges acute stroke patients from the acute care units and the Inpatient Rehabilitation Unit (IRU).

All study patients received standard care as detailed below. Participants were randomized to receive either a structured home visit or a structured phone call by a home health registered nurse (HH RN) 24 – 96 hours after discharge. Patient responses to structured questions asked at either the home visit or phone call and data regarding discrepancies identified during medication reconciliation were collected. Data regarding any environmental or safety issues identified were tracked as well.

At 30 - 35 days post discharge, the HH RN contacted the patient by phone and asked them to respond to the 3-Item Care Transition Measures (CTM–3) tool. The participants also were asked if a re-hospitalization or emergency room visit to any facility had occurred since their discharge. Responses for the CTM-3 and questions regarding hospital / emergency department were answered by the patient or their primary support person. In addition, patient mortality in the first 30 days post discharge was tracked.

Standard care.

Standard care for stroke patients in this facility consists of education throughout the hospital stay regarding their disease process, medications and self care. The facility has developed two patient education booklets regarding stroke care. The first booklet includes the basic, must know information regarding stroke and highlights the presence / absence of the patient's individual risk factors and needed behavior modification. The booklet has a checklist of risk factors for stroke. Risk factors that apply to

the patient are checked and vital signs and laboratory values are filled in by the patient's RN. The risk factors are reviewed with the patient during hospitalization and at discharge. The second booklet gives additional detail on the causes of high blood pressure and elevated cholesterol and includes additional information on lifestyle modifications. This booklet reinforces management of blood pressure, lipid levels and modifiable risk factors. Using Readability Studio software, to evaluate the literacy level, the booklets score at a 6.7 grade level. The hospital also uses Krames patient education materials and patients are given information specific to other comorbidities from this tool.

The facility implemented the After Hospital Care Plan (AHCP), as detailed by RED, as part of their standard care two months prior to the initiation of this project. Rather than having a specific Discharge Advocate; the duties of RED are distributed among the staff RN caring for the patient and the unit secretary. The AHCP is printed in a large font and includes detailed information on: the reason for hospitalization; medications including dosing, side effects and purpose; contact information for the hospital, primary care provider and emergency instructions; details of all post discharge appointments; pending test results; diet, activity and special recommendations; and smoking cessation.

The final review of all components of the AHCP is the responsibility of the staff RN discharging the patient. This nurse is responsible for reviewing the plan with the patient at discharge. Patients are instructed to take the AHCP to all of their follow up appointments. The patient's primary care provider is auto faxed a copy of the patient's discharge summary when it is completed by the inpatient physician at discharge.

Methods

Sample.

Participants were recruited from patients with a diagnosis of acute stroke and hospitalized at the participating facility. The service area for the facility includes three counties in north-central Ohio. The population of these counties, which are classified as rural, is primarily white (96 – 98%) with a household median income between $43,533 - 48,375 (Rural assistance center. 2012; U.S. census bureau, state and county QuickFacts. 2012). The percentage of individuals completing high school varies with two of the

counties being at 85 – 86% and one county at 56% (U.S. census bureau, state and county QuickFacts. 2012). Rates of a language other than English spoken at home are variable. Two of the counties have a rate of 7 – 10%, while the third county has 44% of households with a language other than English spoken (Rural assistance center. 2012; U.S. census bureau, state and county QuickFacts. 2012). One of the counties has a large population of Amish, accounting for the differences in education and primary language used at home between this county and the others. The language spoken in Amish households is Pennsylvania Dutch which is primarily a spoken, not written language. Amish adults speak and write English.

Approximately 120 patients with the diagnosis of an acute stroke are admitted to the facility yearly. During the four month study period from November, 2012 through March, 2013, 33 patients with the diagnosis of acute stroke were admitted. Nine patients met the inclusion criteria and all nine completed the informed consent process.

Inclusion criteria.

Patients admitted to the study facility with a diagnosis of acute stroke and who were discharged from an acute care unit or the Inpatient Rehabilitation Unit (IRU) either to home, a family member's home or another non-institutional setting were approached by the facility's Stroke Program Coordinator or IRU Manager for interest in participation in the project. To participate, patients had to be able to speak and understand English and have access to a telephone. Patients were assessed using the Functional Independence Measure (FIM ™) and needed to have an average FIM ™ score of 4 (minimal assistance) across the sections related to cognitive functioning. Details of the FIM ™ tool are reviewed later. Table 1 details the inclusion and exclusion criteria.

Exclusion criteria.

Patients who were discharged to an institutional setting such as a long-term acute care hospital, nursing home or assisted living facility were not eligible to participate. Patients who did not speak or understand English or have access to a telephone were excluded. Patients who scored lower than an

average of 4 (minimal assistance) on the FIM ™ indicators of cognitive functioning or who had a physician order for follow up by any home healthcare agency were also excluded.

Table 1

Inclusion and Exclusion Criteria

Inclusion Criteria	**Exclusion Criteria**
Diagnosis of Stroke	No diagnosis of stroke
Discharged from Acute Care or Inpatient Rehabilitation Unit	Discharged from Acute Care or Inpatient Rehabilitation Unit
Discharged to home or family member's home (non institutional setting)	Discharged to an institutional setting (skilled nursing facility, assisted living, acute care hospital, Long Term Acute Care Hospital)
Average FIM score on 5 cognitive items ≥ 4	Average FIM score on 5 cognitive items < 4
Patient not receiving physician ordered Home Health Services on a recurring basis	Patients receiving physician ordered Home Health Services on a recurring basis
Ability to speak and understand English	Unable to speak and understand English
Have access to a phone	No access to a phone

Informed consent and randomization.

If patients met the inclusion criteria and expressed interest in participating, the Stroke Program Coordinator, a certified Clinical Nurse Specialist, or the IRU manager, a masters degree prepared nurse, initiated the consent process. The risks and benefits of participation were explained using the informed consent script developed for the project. The primary benefit to the patient was either the phone call or the home visit by a registered nurse at no cost to the patient or family. The risks were minimal, as the assessment tool is a three-question – answer activity and the home visit or phone call is an additional, free service to usual follow-up care. To minimize any anxiety or potential for distress, patients were informed that they did not have to answer any questions that they did not wish to answer and that they could end their participation at any time. After completing the consent process, the CNS or IRU Manager randomized the participant to the post discharge call group (Option 1) or the post discharge home visit group (Option 2). Participants were randomized based upon their account number: patients with an odd

account number were placed into the phone call intervention and those with an even number received a home visit. Account numbers are assigned in numerical order at the beginning of each patient visit and are not linked to patient characteristics or medical record number. Patients were informed of which group they were randomized to upon completion of the consent process.

Project staff and time commitment.

The data collectors for the project were the DNP student, the chronic disease home health nurse, the home health manager, the manager of the IRU and the Clinical Nurse Specialist (CNS) who functions as the Stroke Program Coordinator. All nurses completed Collaborative Institutional Training (CITI) courses in the protection of human research subjects. These nurses were experienced in working with this patient population, each having over 25 years of nursing experience (ranging from 25 – 40 years in nursing and at least 8 years in their specialty area). The participants were assessed for fatigue and the need to take breaks and rest on an ongoing basis. The total time of participation for all parts of the project, from in-hospital screening with the FIM ™ through the follow-up phone call at 30 – 35 days was 1 hour 25 minutes – 1 hour 48 minutes. The time commitment was as follows:

- FIM ™ cognitive assessment: 5 minutes (if it was not already completed as part of routine care)
- Informed consent: 20 -30 minutes
- Option 1: Follow-up phone call at 24 – 96 hours post discharge including preparation and call: mean of 45 minutes
- Option 2: Follow-up home visit at 24 – 96 hours post discharge including preparation, drive time and visit: mean of 68 minutes
- Post discharge phone call at 30 – 35 days post discharge: 5 minutes

As part of her role, the CNS reviews all hospitalized patients on a daily basis to identify patients with a diagnosis of stroke. She continued that practice for this project and identified potential participants. In her absence, the IRU manager fulfilled this role. When a patient was identified as a potential

participant, they were screened to determine if they meet inclusion criteria. The FIM ™ scoring for patients on the IRU is part of the patient's assessment and was completed by a staff nurse trained in the tool. FIM™ scoring for patients on the acute units was completed by either the CNS or the IRU manager; both nurses were certified in administering the FIM™ tool. The DNP student instructed the Stroke Program Coordinator CNS and the IRU manager in the informed consent process, using the informed consent script.

Intervention.

Components of both interventions.

The patient was asked to reference their AHCP during the call or visit. In addition to a detailed medication reconciliation (including name, dose, route, frequency, purpose and special considerations) and a home safety assessment, responses to the following structured questions were collected:

- patient recall of the reason they were hospitalized
- patient recall of their risk factors for stroke
- presence of a new problem since discharge
- confirmation that the patient was able to fill all prescriptions
- confirmation of use of the AHCP medication list and / or calendar (as appropriate) or pill box
- reinforcement of appointments that were scheduled prior to the patients discharge and confirmation that the patient / primary caregiver had scheduled appointments that were not able to be scheduled prior to discharge
- need for clarification of follow-up appointments, testing
- confirmation of transportation arrangements to follow-up appointments, testing
- need for clarification of diet
- need for clarification of activity
- what to do if a problem arose, either urgent or non-urgent, and how to contact their physician(s)

Based upon the medication reconciliation, the number of medication discrepancies were identified and tracked. Medication discrepancies were defined as any incorrect response to medication name, strength, route, frequency, special considerations or purpose. Failure to fill a prescription was counted as a discrepancy. Using the safety assessment, the number of barriers and safety issues identified was tracked.

If the HH RN was unavailable for either the structured phone call or home visit, the home health manager, who routinely functions as a back up to the HH staff, was her alternate. Each of these nurses received the same training on the procedures for the study. If the patient was unable to participate in the call or visit due to their illness, the patient's primary caregiver participated and responded to the questions on the patient's behalf.

Structured phone call.

All patients received standard care as described earlier. Patients randomized to the structured phone call received a phone call to the number provided by the patient or family. The facility's chronic disease home health registered nurse (HH RN) or HH manager initiated the call 24 – 96 hours after the participant's discharge. Up to three attempts were made to contact the patient / primary caregiver via phone for the follow-up.

The structured call used a script developed for the project using RED principles and the AHCP (Jack et al., 2009; Jack & Boston Medical Center, 2010; Rutherford et al., 2011). The contents of the script were detailed earlier. The same script was also used for the home visit. The participant was asked to have their AHCP and medications available for the phone call. A copy of the patient's AHCP and their individualized risk factor checklist were available to the HH RNs for reference. The HH RNs tracked and documented the amount of time spent preparing for the call and conducting the call. The medication reconciliation was completed using the standard script developed for the project and the principles of the HH Medication Reconciliation algorithm (Figure 2). Home safety and barriers were assessed using a question and answer home safety assessment developed for the project. This assessment was based on the environmental and safety assessment contained in the home health electronic medical record, Allscripts. The assessment included: the amount of time the patient was alone, use of assistive devices, barriers at

entry and throughout the home, environmental factors affecting mobility, concerns regarding steadiness and strength for ambulation and movement, presence of safety features such as smoke detectors and understanding of what to do if a safety issue arose. The nurses discussed identified safety concerns with the patient and family for resolution.

Home visit.

Participants randomized to the home visit received standard care in the hospital as described earlier. In addition, they received a home visit by the HH RN within 24 – 96 hours after discharge. The HH RN contacted the patient / primary caregiver up to three times to schedule the home visit and was permitted to reschedule the visit one time if the participant was not available at the agreed upon time. The home visit followed the same script as the structured phone call and included all of the same elements. A copy of the patient's AHCP and their individualized risk factor checklist were available to the HH RNs for reference. The HH RNs tracked and documented the amount of time spent preparing for the visit, driving time to and from the visit and the time spent at the patient's home.

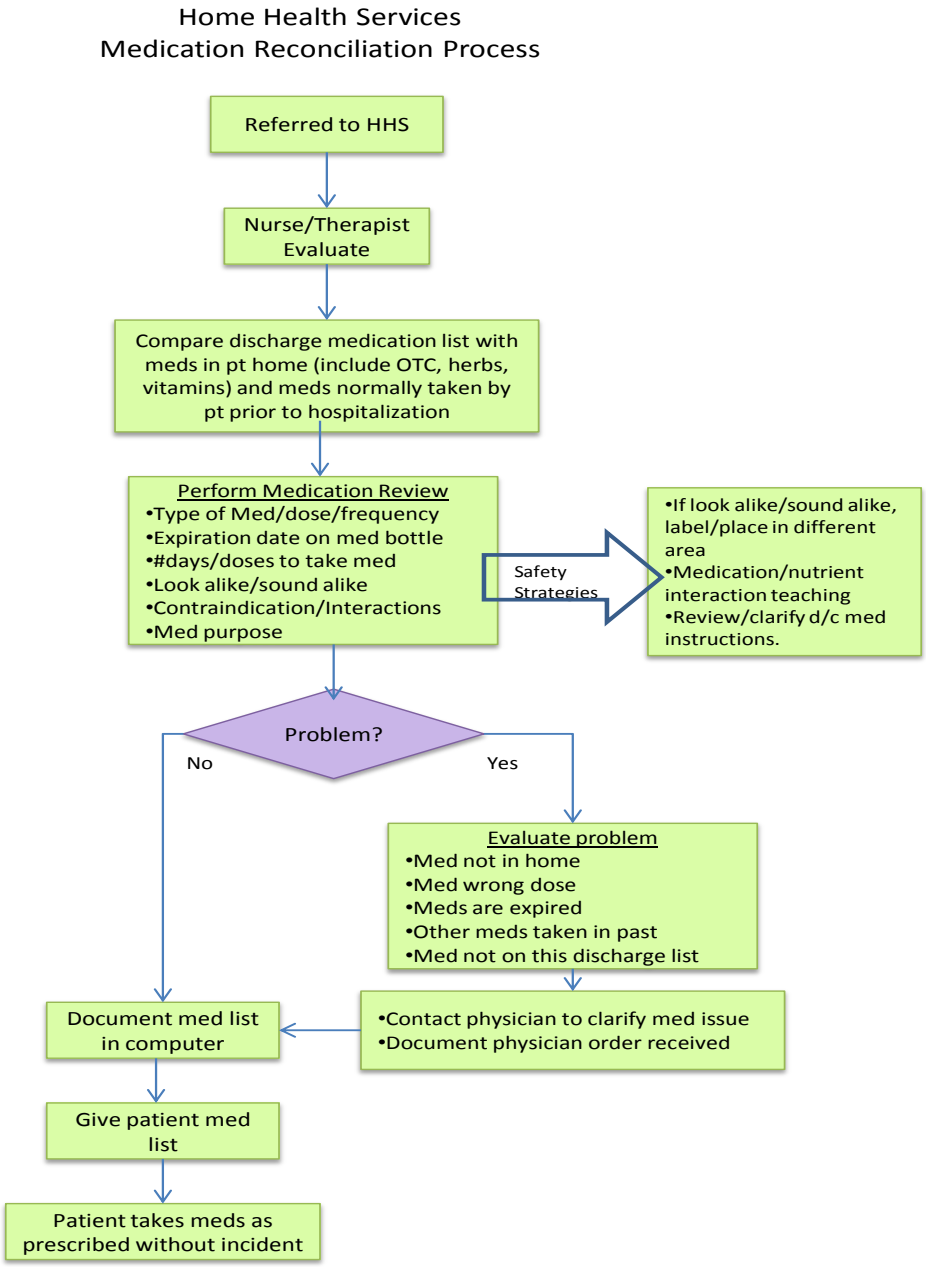

Figure 2. Home Health Medication Reconciliation Process.

At no less than 30, but no more than 35 days post discharge, the HH RN phoned the participants at the number provided. Either the patient or the patient's primary caregiver answered the questions. Up to four attempts to reach the patient or family member were made. The participant's satisfaction with the transition was assessed using the Care Transitions Measures – 3. This tool asks three questions to

measure (assess) patient and family satisfaction with the transition home. The patient or caregiver was asked if the patient has been re-hospitalized for any reason or if they had had a visit to any emergency department. Table 2 details the steps of the project process from identification of potential participants through the follow-up phone call at 30 – 35 days post discharge.

Table 2

Project Intervention Components

What	When	Who	How
Screen admissions for a diagnosis of Stroke	0 - 48 hours after admission	Stroke Program CNS	EMR admission list
Screen patients with a diagnosis of stroke for inclusion / exclusion criteria	24 - 72 hours after adm for acute care; 24 - 48 hours prior to discharge for patients on the IRU	Stroke Program CNS	Is patient on an acute care unit or Inpatient Rehab? Is the discharge destination home / family member's home? Does the FIM score meet inclusion criteria? Only patients who are not ordered home health are eligible.
Approach patients meeting inclusion criteria for consent to participate	24 - 72 hours after adm for acute care; 24 - 48 hours prior to discharge for patients on the IRU	Stroke Program CNS	Use informed consent script
Patients who consent to participate are randomized to phone call or HH visit follow up	Inform patient which group they are randomized to after consent process is complete	Stroke Program CNS	Randomization: odd account numbers for the current visit are assigned to the phone call intervention. Even numbers are assigned to the home visit intervention. Both groups receive standard care.
Option 1: Follow up phone call including: reinforcement of the education about stroke, review of homegoing instructions, review of when to contact their primary care provider or go to the emergency department, confirmation of follow up appointments, a detailed medication reconciliation and home safety assessment with suggestions for modifications.	24 - 96 hours post discharge	Home Health RN	Use follow up phone call script including: reinforcement of education about stroke, review of homegoing instructions including diet and activity, review of when to contact their primary care provider or go to the emergency department, confirmation of follow up appointments, a detailed medication reconciliation and home safety assessment.
Option 2: Home visit including: reinforcement of the education about stroke, review of homegoing instructions, review of when to contact their primary care provider or go to the emergency department, confirmation of follow up appointments, a detailed medication reconciliation and home safety assessment with suggestions for modifications.	24 - 96 hours post discharge	Home Health RN	Use the home visit standard script including: reinforcement of education about stroke, review of homegoing instructions including diet and activity, review of when to contact their primary care provider or go to the emergency department, confirmation of follow up appointments, a detailed medication reconciliation and home safety assessment. The medication reconciliation will be completed using the HH Medication Reconciliation algorithm.
Phone call to assess for: 1) Admission to any hospital 2) Use of any emergency department (hospital based or free standing) 3) CTM-3 score 4) Death	30 - 35 days post discharge	Home Health RN	Use 30 day post follow up phone call script

Instruments

The instruments used in the project include the FIM ™ and the 3-Item Care Transitions Measure. Completion of medication reconciliation and reinforcement of disease specific education followed standard procedures established for all home health clients by the agency. A script developed by the DNP student guided the structured phone call and the structured home visit. Data for each point in the scripts were collected. The assessment of home safety used by the facility is included in their EMR from Allscripts. It was streamlined and modified to be able to be completed for both interventions. These assessments and procedures have been developed by the facility to meet regulatory compliance standards for CMS and The Joint Commission.

Functional independence measure (FIM ™).

The FIM ™ tool measures the patient's level of physical and cognitive disability with a focus on the level of disability (Uniform Data System for Medical Rehabilitation, 2001). The entire tool is comprised of 18 measures which are divided into motor and cognitive categories. The five components related to cognitive status were used to assess the study participant's cognitive abilities: comprehension, expression, social interaction, problem solving and memory. Each item is ranked from one to seven with one indicating that the individual requires total assistance and seven indicating that the patient is independent and functions safely. Zero is used to indicate that the activity does not occur. An average score of 4 across the five items was used as a screening process to determine the patient's ability to give consent for participation in the project. Table 3 details the five items in the cognitive sub scale and the scoring grid for each.

Table 3

Elements of the Cognitive Subscale of the FIM

	Comprehension: Understanding auditory or visual communication	**Expression**: Includes clear vocal & non-verbal expression	**Social Interaction**: Skills of getting along w/ others & participating	**Problem Solving**: Reasonable and safe decisions	**Memory**: Store & retrieve information. Remember routines & people
7: Independent. Performs in reasonable time & safely.	Understands complex or abstract communication	Expresses complex & abstract ideas clearly	Interacts appropriately w/ staff / others. Controls temper	Solves complex problems & self corrects if necessary	Remembers people, routine & executes request without repetition
6: Modified. Independent. Includes taking more time or safety problem or uses device	Only mild difficulty understanding complex / abstract communication. Or uses device.	Only mild difficulty expressing complex / abstract ideas. Or needs device.	Mostly appropriate. May need meds. No supervision needed.	Solves complex problems with only mild difficulty or needs more time.	Only mild difficulty remembering people, routine & requests.
5: Supervision or set up. Also includes cuing or coaxing - no physical touch	Understands re basic needs, conversation or directions 90%+. Needs prompting < 10% of time.	Expresses basic daily needs more than 90% of time.	Needs supervision < 10% of time OR needs encouragement to participate.	Needs cuing to solve routine problems but no more than 10% of time.	Needs cuing <10% of time & only under stressful or unfamiliar situations.
4: Minimal Assistance	Understands conversation re basic needs 75 – 90% of time.	Expresses basic daily needs 75 – 90% of time.	Interacts appropriately 75 - 90% of time.	Solves problems 75 – 90% of time.	Recognizes& remembers 75 – 90% of time.
3: Moderate Assistance	Understands conversation re basic needs 50 – 74% of time.	Expresses basic daily needs 50 – 74% of time.	Interacts appropriately 50 - 74% of time.	Solves problems 50 – 74% of time.	Recognizes and remembers – 74% of time.
2: Maximum Assistance	Understands 25 – 49% of time.	Expresses 25 – 49% of time.	Interacts appropriately 25 - 49% of time or needs restraint.	Solves problems 25 – 49% of time.	Recognizes & remembers 25 – 49% of time.
1: Total Assistance	Understands < 25% of time.	Expresses < 25% of time.	Appropriate < 25% of time.	Solves < 25% of time or needs restraint.	Recognizes & remembers < 25% of time.

The FIM ™ tool is used widely to assess patients undergoing physical rehabilitation from conditions such as traumatic brain injury, stroke and complex orthopedic surgeries. The tool is administered by a trained healthcare professional with patient participation. It can take up to two hours to administer the entire twenty measure tool; however, the five sections identified require no more than twenty minutes. This tool is proprietary and permission for use was obtained.

In an evaluation of the use of the FIM ™ with more than 93,000 patients, the tool compares favorably to other standardized health measures used in healthcare (Stineman et al., 1996). Cronbach's alpha ranged from .88 - .97 for the total FIM ™ and from .86 to .95 for the cognitive FIM ™. This compares to .65 to .94 for the Short Form Health Survey (SF-36 ™) (Stineman et al., 1996). Internal consistency for the FIM ™ for stroke patients was .94 for the entire 18 items, .93 for the motor subscale and .93 for the cognitive subscale (Stineman et al., 1996). In a review of 11 studies related to the FIM ™ with a total of 1,568 patients, the median inter-rater reliability for the tool was .95 and the median test-retest reliability values were .95 and .92. The authors concluded that the tool demonstrated acceptable reliability across a variety of settings and with a variety of patients (Ottenbacher, Hsu, Granger, & Fiedler, 1996).

Care transition measure – 3 (CTM-3).

The other instrument used was the CTM-3. The CTM-3 was developed from the 15-Item Care Transitions Measure (CTM-15). The CTM-15 was developed based upon feedback from focus groups of patients and caregivers regarding their experience with the transition of care across healthcare settings. The tool was pilot tested and had input from experts in geriatric healthcare delivery (Coleman et al., 2002). Testing of formal construct validity for the CTM-15 was done by comparing it to a patient satisfaction measure developed by Hendricks and colleagues from the University of Amsterdam. Their tool evaluated 12 aspects of care with a section specific to discharge and transition (Hendriks, Vrielink, Smets, van Es, & De Haes, 2001). The specific questions regarding discharge and after care in the Hendricks' tool were used in assessing the effectiveness of the CTM-15. The comparison between the

CTM-15 and the Hendricks' tool demonstrated a Spearman inter-item correlation between 0.250 (low) and 0.750 (moderate) (Coleman et al., 2002).

The CTM-3 was later developed out of the CTM-15 to decrease the amount of time required to complete the tool. The CTM-3 was endorsed by the National Quality Forum in 2006 (Parry, Mahoney, Chalmers, & Coleman, 2008). The CTM-3 has been tested with diverse populations and the results compared with the CTM-15. The CTM-3 tool was able to identify variation in the quality of a patient's care transition. The CTM-3 uses three questions each with a 4 point response scale: strongly disagree (1), disagree (2), agree (3), and strongly agree (4). The CTM-3 uses three questions (CTM 1, CTM 2, CTM 3) to assess patient satisfaction with their transition from hospital to home:

- CTM 1: The hospital staff took my preferences and those of my family or caregiver into account in deciding *what* my health care needs would be when I left the hospital.
- CTM 2: When I left the hospital, I had a good understanding of the things I was responsible for in managing my health.
- CTM 3: When I left the hospital, I clearly understood the purpose for taking each of my medications.

As of January 1, 2013, the three CTM-3 questions have been incorporated into the HCAHPS survey that all hospitals must use to survey their patients for satisfaction.

The DNP student trained the two Home Health RNs to administer the CTM-3. The student also instructed the Home Health RNs on the use of the script for the follow-up phone call or structured home visit and the 30-day follow-up phone call script. The scripts depicted a step by step description of the process and allowed the nurses to document problems, issues and responses to the questions directly on the form. The HH RNs involved in the project were proficient in completion of the home safety assessment, medication reconciliation, patient education and reinforcement of discharge teaching and plans.

Data Entry

The DNP student entered demographic and risk factor data, FIM, CTM-3 and information from the home visit or phone call tool into an Excel file. Demographic and risk factor data regarding the participants were abstracted from the hospital's electronic medical record. The data points included were:

- age
- race
- gender
- highest formal education
- county of residence
- current tobacco product use of any type
- Body Mass Index (BMI)
- lipid values
- history of hypertension and if controlled or uncontrolled prior to admission
- number of medications on admission to and discharge from the facility

All electronically entered data was stored on the facility's secure network and hard copies of the completed tools were stored in a locked, secure area. The master list of participants and their study identification numbers were stored in a separate electronic file, apart from the information that was identified only by study number. Only the DNP student had access to the electronic data files. The CNS and IRU manager had access to the patient's EMR for screening and consent. The two HH RNs used a paper copy of the script to collect data. The data collection form from the call or visit was returned to the co-investigator after the intervention. The data collection form was given to the HH RNs several days prior to the 30 – 35 day follow-up window. The responses to the follow-up phone call were collected on the paper forms. The data from each patient was entered into the electronic tracking form by the DNP student. Hard copy records of the AHCP and patient risk factors were returned to the co-investigator and destroyed after the 30 – 35 day follow-up phone call. In the interim between the initial post discharge

phone call or home visit, the paper copies of this information were stored in a locked, secure location in the main hospital.

Data Analysis

Data analysis consisted of an initial review for completeness and accuracy; any missing data elements were addressed. The CTM-3 has algorithm that was used to calculate the total score and this was used in the analysis. All data were available with the exception of lipid levels for two patients.

The data were reviewed and analyzed using descriptive statistics. Eight participants completed the study and because of the limited number, more detailed analyses were not possible. The demographic data were used solely to describe the characteristics of the participants. Percentages for readmission and ED use, and score of the CTM-3 were calculated and compared to the hospital's historical data for readmission and patient satisfaction. The number of medications on admission to the hospital and the number of discharge medications were tracked and analyzed with the percent increase in the number of medications reported. The number of medications prescribed and factors that lead to medication errors determined the number of medication discrepancies. Information regarding compliance with filling discharge prescriptions and with making follow-up provider appointments was tracked. The number and type of safety issues noted during the environmental assessment were evaluated. The amount of time the HH RN spent completing either the phone call or the home visit was tracked to determine the cost of each type of intervention. The data was reviewed and analyzed for any unanticipated findings.

Chapter 4: Findings

Results

Demographics.

A total of nine patients were enrolled in this proof-of-concept project over a period of four months. One patient elected not to participate after discharge and one patient, at the time of this writing, has completed the home visit but not the 30 – 35 day post call. No reason for declining participation was given by the individual who elected to not participate after discharge. Ultimately, seven patients completed the study and one partially completed. Table 4 details the demographic data of the participants.

Table 4

Demographic Data

	Phone Call		Home Visit		Overall	
	N	%	N	%	N	%
Gender						
Male	4	80%	3	100%	7	87.5%
Female	1	20%	.	.	1	12.5%
Race						
African American			1	33.3%	1	12.5%
Caucasian / White	5	100%	2	66.7%	7	87.5%
Average Age	5	59.4 years	3	49.7 years	8	55.8 years
Education						
High School or GED	2	40%	2	66.7%	4	50%
Some College	2	40%			2	25%
Associate or Bachelor degree	1	20%			1	12.5%
Masters degree			1	33.3%	1	12.5%
County of Residence						
Ashland	2	40%			2	25%
Wayne	3	60%	3	100%	6	75%

The demographics of the participants are reflective of the demographics for the service area. The 2010 educational distribution for Wayne County was reported as (Wayne economic development council. 2013):

- 15.3% - less than high school
- 43.4% high school graduate or equivalency
- 16.3% - some college, no degree
- 6% - Associates degree
- 12.7% - Bachelor's degree
- 6.3% - Graduate or professional degree

The educational distribution for the participants approximated the same distribution as the county.

Wayne and Ashland counties report 1.6% and 0.6% of the population as African American respectively (U.S. census bureau, state and county QuickFacts. 2012). One study participant was African American. The racial mix of the study participants was 87.5% Caucasian, and 12.5% African American. The higher percentage of African American's in the participant group, versus the overall population, may be due to the higher risk of stroke among African American's. The risk of first stroke for African American's is almost double that of whites (Roger et al., 2012). The small sample size may also have had an impact on the racial distribution.

Excluded patients.

During the four month project period, thirty-three acute stroke patients were admitted to the facility. Twenty-four of the patients were excluded from participation, with 22 excluded because they did not meet inclusion criteria. The most common reason for exclusion was discharge to an institutional setting. Two patients who met inclusion criteria were not asked to participate in the study. One was missed due to timing of his discharge. The patient was admitted on a Friday at 1930 and was discharged on Sunday afternoon after a 43 hour hospitalization. The discharge materialized quickly and there was no opportunity to request his participation. A second patient met inclusion criteria but lived 1 hour and 45

minutes away from the facility, far outside the range of the home health agency. For that reason, she was not included. Table 5 details the reasons for exclusion. Some patients had more than one reason; therefore, the number of reasons adds up to more than twenty-four. Two patients were excluded because they were discharged home with hospice; an exclusion criterion not originally considered. No patients were excluded solely on the basis of their cognitive FIM score.

Table 5

Excluded Stroke Patients

N	Male	Female	Average Age	Not DC from Acute care or IRU	DC to institutional setting	DC home with Hospice	HH Nursing Ordered	HH Therapy Ordered	Unable to speak / understand English	No access to phone	Other
24	8	16	79.7	2	11	4	3	7	0	0	2

Risk factors, participant characteristics and knowledge.

Stroke risk factors tracked in the participant group included BMI, cholesterol, low density lipoprotein (LDL), smoking and hypertension. Tables 6 and 7 detail risk factors prevalent with the participants. In aggregate, the participants had a BMI of 33. Two of the patients, both in the home visit group, had a normal weight BMI (18.5 – 25). Of the remaining six participants, two were overweight (BMI 25 – 30), two were obese (BMI 30 – 40) and two were morbidly obese (BMI > 40). Seventy-five percent of the participants were overweight or obese. According to the Behavioral Risk Factor Surveillance System (BRFSS) results from 2007, 63.5% of Ohioans were overweight or obese (Centers for Disease Control and Prevention, 2011). Wayne and Ashland Counties have an obesity rate of 32% and 30% respectively; a rate of 30% is reported for the state of Ohio (University of Wisconsin, Population Health Institute, 2013). The rate of obesity for Wayne County has been increasing more rapidly than the state and the county. In Ashland County, obesity is increasing at the same rate as the state and nation (University of Wisconsin, Population Health Institute, 2013). The participants demonstrated a higher rate of being overweight and obese than the population as a whole.

Cholesterol levels in aggregate for the participants were in the desirable range (< 200mg/dL) based upon the range for the facility. Five participants had normal cholesterol levels, one had elevated levels. Two of the participants had elevated LDL levels with results > 130; four had normal levels. Two participants did not have their cholesterol or LDL measured in the facility.

Five of the participants (62.5%) smoked. In Ohio, 22.5% of adults smoke; nationally, the rate is 17.3% (Centers for Disease Control and Prevention, 2012). The rate of smoking in Wayne and Ashland Counties is 18%, lower than the state average (University of Wisconsin, Population Health Institute, 2013). The participants demonstrated a smoking rate significantly higher than that of the general population of the state and county. Seven of the eight participants (88%) were noted to have hypertension. Of the hypertensive patients, all were uncontrolled, with a blood pressure of at least 140/90 document three or more times before antihypertensive therapy was initiated and effective during hospitalization. Using data from the 2007 BRFSS, 28.4% of Ohioans reported having high blood pressure (Centers for Disease Control and Prevention, 2011).

Table 6

Participant Risk Factors: Body Mass Index and Lipid Levels

	Phone Call				Home Visit				Overall			
	N	Mean	Min	Max	N	Mean	Min	Max	N	Mean	Min	Max
Body Mass Index (BMI)	5	37	28	46	3	28	22	39	8	33	22	46
Cholesterol mg/dL	3	237	153	379	3	158	144	180	6	198	144	379
LDL mg/dL	3	176	83	313	3	91	67	120	6	133	67	313

Table 7

Participant Risk Factors: Smoking and Hypertension

	Phone Call		Home Visit		Overall	
	N	%	N	%	N	%
Smoking						
Smoker	3	60	2	66.7	5	62.5
Non-Smoker	2	40	1	33.3	3	37.5
Hypertension	5	100%	2	67%	7	88%
No History of Hypertension	0	0%	1	33%		0%
Hypertension Controlled	0	0%	0	0%	0	0%
Hypertension Uncontrolled	5	100%	2	67%	7	88%

All participants knew their discharge diagnosis of stroke. Six of the participants could name all signs and symptoms of a stroke and five were able to list all of their stroke risk factors. Two of the participants had new problems after discharge: one was having difficulties managing their glucose levels and insulin and the other stated they were now cold all of the time.

Medication assessment.

Taking medications correctly can be the key to a successful transition of care. The number of medications patients were taking on admission and at discharge was evaluated. Medication taking ranged from no medications before admission, up to nine medications. On average, participants were taking 3.25 medications on admission. At discharge, the number of medications prescribed ranged from four to ten with a mean of 7.5. Overall, participants had a 131% increase in the number of medications prescribed at discharge. This data is reflected in Table 8.

Table 8

Change in Number of Medications Prescribed

	Phone					Visit					Overall				
	N	Mean	STD	Min	Max	N	Mean	STD	Min	Max	N	Mean	STD	Min	Max
Number of Medications on Admission	5	3.8	3.56	0	9	3	2.33	0.58	2	3	8	3.25	2.82	0	9
Number of Homegoing Medications	5	8.4	1.82	6	10	3	6	1.73	4	7	8	7.5	2.07	4	10
Increase in Number of Medications		4.6					3.67					4.25			
% Increase		121%					158%					131%			

During the visit or phone call, participants were asked about each of their medications. They were asked to state the strength, route, how often they were to take it, at what time of day it was to be taken, any special instructions for taking the medication, the reason or purpose for taking the medication and to identify at least one potential or actual side effect of the medication. They were encouraged to use their After Hospital Care Plan (AHCP) to assist with these questions. Each correct answer was noted and counted as '1'. Special instructions were the one variable that did not have an affirmative answer for every drug. If the participant could identify the special instruction or if there were none, it was also counted as '1'; incorrect answers were not given a value.

Medication issues were evaluated in two ways. First, the total number of correct responses was divided by the potential number of correct responses to determine a percentage correct. The percent of accuracy for knowledge about their medications is in Table 9. The number of issues the patients had about their medications was also noted. If a prescription was not filled, it was counted as one issue. If a patient could not name the dosage for two medications, two issues were counted. This information is reflected in Table 10.

Table 9

Accuracy of Knowledge about Medications

	Phone	Visit	Overall
	Mean	Mean	Mean
Strength correct	95%	78%	90%
Route correct	95%	78%	90%
Frequency correct	95%	78%	90%
Time of day correct	95%	78%	90%
Special Instructions	95%	61%	85%
Reason / Purpose	86%	78%	83%
Knows Side Effects	76%	72%	75%
Overall Average Percentage Correct	91%	75%	86%

Table 10

Medication Issues

	Phone			Visit			Overall		
	N = 5			N = 3			N = 8		
	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
Medication Issues	2.6	0	10	3.7	1	6	3	0	10

Prior to discharge, patients were given an individualized AHCP and instructed to use the "My Medication" portion to guide them in taking their medications correctly. All but one patient used the AHCP medication information. Two patients used both the AHCP and a medication box; one patient used only a medication box. The patient who did not use the AHCP had ten medication issues, which was the highest number. This information is reflected in Table 11.

Table 11

Use of Medication Aids

	Phone			Visit			Overall		
	N = 5			N = 3			N = 8		
	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
Medication Issues	2.6	0	10	3.7	1	6	3	0	10

Three patients needed medication follow up. In the phone call intervention group, a patient had poor glucose control and needed their insulin adjusted. Among the home visit patients, one wished to change pain medication and a second was discharged without prescriptions for three of their six medications (statin, beta blocker and ACE inhibitor). The medications were critically important ion managing his stroke and congestive heart failure. The HH RN was able to intervene with both patients to assist them in resolving these issues.

Appointments, diet and activity.

As part of the discharge process for the facility, hospital staff made the follow-up appointments for patients prior to discharge. Seven of the eight participants confirmed that they had their primary care, specialist and therapy appointments scheduled at the time of the call or home visit. These seven patients indicated that the appointments were at times that were convenient for them and their support person and that they had already kept the appointments or intended to keep them. One patient did not have their appointments made by the hospital staff; this patient has his healthcare through the Veteran's Administration (VA) and could not name his primary care physician. Making appointments at the VA is often very difficult and patients usually make their own appointments.

Seven of the eight patients knew their recommended diet and could describe any restrictions. Seven patients indicated that they were compliant with their diet and could describe what they should or should not eat. The remaining patient stated that no one had reviewed her diet with her and that she did

not know what restrictions she had. All patients understood their prescribed activity level and restrictions.

Safety issues.

The safety assessment showed that the majority (62.5%) of patients were never alone or were alone less than 25% of the time. Five patients were instructed to use an assistive device (cane or walker) at home. Three of the eight participants had barriers at the entry to their home that consisted of steps, which were difficult to navigate, or narrow doorways, through which assistive devices were difficult to maneuver. Other identified safety issues included:

- No light in the bedroom that the participant can turn off / on from the bed (1)
- Lack of ability to move about the bathroom easily due to either clutter, tripping hazards or lack of space (1)
- Absence of a night light in the bathroom (3)
- Unsteady on their feet (2)
- Lack of a fire extinguisher in the home (2)
- Lack of an escape plan in case of a household emergency (1)
- Need for an emergency device to call for help (1)

Only two participants did not have any identified safety issues. The number of issues identified ranged from one to five, and are detailed in Table 12. During the call or home visit, the HH RN offered suggestions to address the safety issues as they were identified.

Table 12

Safety Issues

	Phone Call		Home Visit		Overall	
	N	%	N	%	N	%
Percent of time alone						
0	3	60%	2	67%	5	62.5%
0- 25%	2	40%	1	33%	3	37.5%
Need and use of Assistive Device	5	100%	0	0%	5	62.5%
Barrier to entry to Home	3	60%	0	0%	3	37.5%
Number of Safety Issues Identified						
0	1	20%	1	33%	2	25%
1	2	40%	.		2	25%
2	.		2	67%	2	25%
3	1	20%	.	.	1	12.5%
5	1	20%	.	.	1	12.5%

Outcomes Measures.

The Care Transition Measures-3 (CTM-3) questions were asked during the 30 – 35 day post discharge call. Scoring for the measures is detailed in Table 13. This outcome measurement tool has a maximum score of 100; higher scores indicate more satisfaction with transition. The lowest score for question 3 (CTM 3) indicated that for this group of patients, understanding their medications was the area of least satisfaction. The score for question 2 (CTM 2) indicated that the participants were most satisfied with understanding how to manage their health. The CTM-3 measures were included in the HCAHPS survey as of January 1, 2013. Data for January 1 through March 31 for the facility shows that the scores were 81.1(84th percentile) for CTM 1, 83.3 (75th percentile) for CTM 2 and 83 (28th percentile) for CTM 3. The N varied with a range of 356 to 446 since patients do not always answer all questions. The patients

in the study scored the CTM-3 measures higher than the baseline for the facility for all measures with the exception of the third question regarding understanding medications.

Table 13

Care Transition Measures-3

	Phone				Visit				Overall				Hospital Baseline
	N = 5				N = 2				N = 7				N = 356-446
	Mean	Min	Max	Calc	Mean	Min	Max	Calc	Mean	Min	Max	Calc	
CTM 1: The hospital staff took my preferences and those of my family or caregiver into account in deciding what my health care needs would be when I left the hospital.	3.2	2	4	80	4	4	4	100	3.4	2	4	86	81.1
CTM 2: When I left the hospital, I had a good understanding of the things I was responsible for in managing my health.	3.6	3	4	90	4	4	4	100	3.7	3	4	93	83.3
CTM 3: When I left the hospital, I clearly understood the purpose for taking each of my medications.	3	1	4	75	3.5	3	4	88	3.1	1	4	79	83
Mean Score	3.27	2	4		3.83	4	4		3.4	2	4		
Calculated Score				82				96				86	82.9

Two patients experienced a negative transition: one, a phone call intervention, returned to the Emergency Department (ED) and one, a home visit, was readmitted. The patient who returned to the Emergency Department did so eight days after discharge. She experienced an episode of slurred speech and confusion which resolved spontaneously after several minutes at home. She was diagnosed with a

TIA and discharged from the ED to home. The patient who was readmitted to the hospital 23 days after discharge was admitted with a diagnosis of acute bronchitis.

Cost.

The time to complete screening, consent and the intervention was less than anticipated. The first phone calls took 45 minutes but decreased to 25 – 30 minutes as the nurses became more familiar with the script. The home visits were 30 – 40 minutes in length. Total time for the home visits was longer due to drive time and 40 minutes of preparation in contacting and arranging a visit for one patient. Overall, the average time for the phone call intervention was 85 minutes and the visit intervention, 108 minutes. If this intervention were to be adopted as part of routine care, eliminating the need for the FIM screening and consent, actual nursing time spent would be 50 minutes for a call and 73 minutes for a visit. Cost for the intervention during the study period (using the staff nurse's base salary of $29.55 plus 40% benefits for a total of $41.37 per hour) was $58.61 for the phone call and $76.43 for the visit. Cost of nursing time for the interventions only was $34.48 for the phone call and $52.29 for the home visit. Driving distances ranged from 1.1 mile to 6.7 miles with an average cost of $1.96 in mileage, which is included in the cost of the home visit interventions. At present, there is no reimbursement for either the home visit or phone call after discharge. The costs are reflected in Table 14.

Table 14

Costs of the Intervention

	Phone				Visit				Overall			
	N = 5				N = 3				N = 8			
	Mean	STD	Min	Max	Mean	STD	Min	Max	Mean	STD	Min	Max
Preparation	11	2.2	10	15	23.3	14.4	15	40	15.6	10.2	10	40
Intervention	34	10.3	25	45	33.3	5.8	30	40	33.8	8.4	25	45
Drive					11.3	4.7	6	15	11.3	4.7	6	15
Follow up Call	5	0	5	5	5	0	5	5	5.0	0	5	5
Total Intervention Time	50	11.7	40	65	73	17	56	90	58.6	17.4	40	90
Screening	5				5				5			
Consent	30				30				30			
Total Study Time	85				108				93.63			
Intervention Only Cost (includes driving)	$ 34.48				$ 52.29				$ 40.43			
Total Study Cost / Participant (includes driving)	$ 58.61				$ 76.43				$ 64.56			

Note. All times are expressed in minutes.

Discussion

Findings compared to the literature.

Results from this project are consistent with many of the findings identified in the literature. Kind et al. (2008) noted that up to 20% of stroke patients experience a bounce-back to a higher level of care. In this project, two patients (25%) experienced a bounce-back. One of these patients was Caucasian with an associates or bachelors' degree, the other was African American with a high school education. African American race and lower levels of post secondary education are two factors associated with bounce-backs (Kind et al., 2008). The literature demonstrates that 50.1% of patients who were readmitted

within 30 days did not have a post-hospitalization follow up visit (Jencks et al., 2009). Both of the patients experiencing bounce-back had kept their follow up physician appointments prior to their ED visit or re-hospitalization. Using the RED components and making the patient's appointments may have facilitated the patient's keeping their follow up visit with their primary care provider.

The HH RNs noted that the patient's responded favorably to both the phone call and home visit. The nurses were able to identify medication and safety issues and offer advice or take action. They were able to reinforce the stroke education provided in the hospital and to offer information and assistance regarding any new problems that the patient was experiencing. The nurses intervened immediately for patients experiencing significant care issues. These findings are consistent with the literature on structured phone calls and home visits post-discharge identified by Turner (1996) and Mistiaen & Poot (2006). These investigators noted that the nurse callers were able to intervene and assist the patient in problem solving identified issues. Two patients in this project had significant medication issues that required immediate intervention by the HH RN. Seven of the eight participants had safety issues identified that required instructions or suggestions for modification from the HH RN.

In a study using follow up phone calls for patients discharged from the Emergency Department, 11% of patients required intervention by the staff (Cochran et al., 2012). This reported rate is much lower than was experienced by this patient population. The difference in the rate of required intervention may be due to the increased complexity of stroke patients following discharge from acute care or rehabilitation in comparison to an ED visit.

Patients who participated in the project experienced a significant increase in their number of medications going from a mean of 3.25 medications on admission, to 7.5 at discharge. Kripliani et al. (2007) noted that patients taking more than five medications daily may need additional counseling or intervention. Seven of the eight project participants were taking more than five medications daily. In another study, patients who had a medication discrepancy were taking an average of nine medications (Coleman et al., 2005). In the Project RED study, pharmacists were able to reach 53% of study participants to complete a medication review. Sixty-five percent of the participants had at least one

medication problem identified and 53% required intervention and corrective action by the pharmacist (Jack et al., 2009). Three of the eight participants were taking nine or more medications putting them at increased risk of a discrepancy; however, the three patients taking the highest number of medications did not have any identified medication issues. Five of the eight study participants (62.5%) had identified medication issues with 25% requiring nurse intervention. The project results were consistent with the RED study in terms of the number of medication issues identified; however, the problems that required immediate intervention were lower.

Patients consistently knew the name, dose, route, frequency, time of day, and special instructions regarding their medications. Knowledge deficits were noted in the area of reason for the medications and side effects. One patient knew the reason for only 3 of her 7 medications. Three patients were unable to identify side effects for at least one of their medications. Five of the identified medication issues were due to intentional nonadherence with patients omitting medications that they did not wish to take. Coleman et al. (2005) found that non intentional nonadherence was the most common contributing factor for medication discrepancies followed by financial barriers and intentional nonadherence. Use of the AHCP medication listing may decrease the incidence of non intentional nonadherence, resulting in intentional nonadherence being more prevalent in the project participants.

Improvements in patient satisfaction with care have been noted in several nurse-led telephone interventions with patients discharged from the emergency department and from a medical unit (Braun et al., 2009; Cochran et al., 2012). Patients discharged from the emergency department demonstrated an improvement in the mean score for “likelihood to recommend” from 80.1 to 86.5 at one facility (Cochran et al., 2012). The Braun et al., (2009) study following medical patients, demonstrated a 6-12% improvement in patient satisfaction across most areas. Patient satisfaction with care continues to be an area of focus for providers and payers. As of January 2013, the CTM-3 questions have been included in the mandatory HCAHPS survey. This will allow the facility to monitor the satisfaction with transition for all patients and to benchmark results with other facilities. As noted earlier, participants in this project

scored the CTM 1 and CTM 2 questions higher than the overall results for the hospital. Using the hospital's initial results, the first two questions scored above the 84th and 75th percentile respectively.

Using the HCAHPS survey results from 2012 (N = 23), the facility's satisfaction with care for stroke patients showed the overall rating of satisfaction with care was at the 98th percentile. The question, "Staff efforts to include you in decisions about your treatment," which is most closely associated with the CTM 1 question, was at the 55th percentile with a mean score of 86.1 for 2012. The CTM 1 question on, "staff taking preferences into account," scored 81.1 hospital-wide for the first quarter of 2013. This score translates to the 84th percentile. The score of 86 experienced by the study participants was higher than the hospital wide score. The score for the HCAHPS question, "Instructions given about how to care for yourself at home," was at the 67th percentile with a mean score of 88.1 for stroke patients during 2012. This question compares most closely to the CTM 2 question regarding "understanding the things I was responsible for". Hospital-wide for the first quarter, the score on the CTM 2 was 83.3 which is the 75th percentile. The score on the CTM 2 for the study participants was 93, indicating a result better than the 75th percentile. Despite the inability to directly compare the three CTM-3 questions to the facility's historical information, the scores for the study patients may indicate that patient satisfaction was improved with the intervention. The HCAHPS questions use a five point scale and cannot be directly compared to the CTM-3 responses, as the HCAHPS survey asks questions to determine if something happened, and the CTM-3 is an outcome measure (The care transitions program.2009).

Safety issues were identified as the primary area of concern by the caregivers of stroke patients during the first month after discharge (Grant et al., 2004). Safety issues were identified as the second most important teaching need by rehabilitation and home health nurses (Pierce et al., 2003). Safety issues were identified for seven of the eight participants during the call or home visit. The impact of the safety issues was variable ranging from barriers to entry of the home, to unsteadiness to lack of suggested nightlights in the bath and bedroom. These identified safety issues may be of more concern as the participants become more independent and active. As stroke survivors recover, rehabilitate, and feel

more secure in their environment, they may engage in activities without asking for assistance or taking precautions increasing their safety risks (Grant et al., 2004).

Lessons learned.

Inclusion and exclusion criteria.

The exclusion criteria greatly impacted the number of stroke patients eligible to participate. Only 24% of stroke patients admitted during the project period met inclusion criteria and were enrolled. No patients declined participation at the time they were approached. After discharge, one patient did not answer her phone and we were unable to follow up with her home visit. Twelve and one half percent of the patients in the intervention group were female, whereas, 67% of the excluded patients were female. There were no observed reasons for the difference in gender distribution between the included and excluded groups. However, it is postulated that the women may have elected a post-acute care setting where assistance was available, such as a skilled nursing facility, because they did not have a spouse or family that was able to assist them at home. The average age of the excluded patients was higher than the included patients: 79.7 years in comparison to 55.8 years. This may be because older patients needed more support after discharge or because they did not have family to assist them at home and had to transition to skilled care or an assisted living facility or had home health ordered. No additional demographic data were collected on the excluded patients, making further comparison impossible.

Ten of those excluded were discharged to skilled nursing and one to assisted living. Two were discharged under the care of Hospice, a possibility not considered in the development of the protocol. The DNP student made the decision to exclude these individuals. If the project is further developed, discharged with Hospice will be an identified exclusion. The older age, and chronic medical conditions which develop as American's age, may have influenced the decision of the patient and families to transition to an institutional setting rather than home. If a patient was excluded because of being discharged to an institutional setting, the cognitive FIM was not completed; therefore, it is unknown if the patient's cognitive impairment may have contributed to their discharge disposition.

Eight patients were excluded because Home Health was ordered. One patient had only Home Health nursing ordered; two had both nursing and therapy ordered. Five patients were ordered only physical therapy. Patients discharged with Home Health physical therapy have medication reconciliation at admission, but no additional teaching regarding medications or behavior modification. Consideration should be given to including patients who are only ordered physical therapy.

Stroke risk factors.

The participants displayed a high number of the risk factors for stroke. Seventy-five percent were overweight, obese or morbidly obese; 62.5% smoked; 88% had hypertension. These risk factors occurred at a rate higher than reported for the state. All of the patients with hypertension were categorized as uncontrolled. Many of these patients were known to have hypertension prior to admission yet exhibited poor control, a significant risk factor for stroke. The high number of non-modified risk factors is concerning from a population management perspective. Wayne and Ashland counties demonstrate higher rates of obesity than the state as well as a more rapidly increasing rate of obesity in Wayne County. These observations identify that there may be a need to screen community members for their individual stroke risk factors and offer education and behavior modification to address identified, modifiable risks. Opportunities for screening and counseling regarding risk factors are available via local health fairs, community and church events and the annual county fair. The hospital has a presence at many of these events and stroke risk factor screening can be incorporated into these events.

Medication use and issues.

Every participant had an increase in the number of medications they were taking, with the exception of one participant. This individual was taking nine medications at the time of their stroke and was discharged on nine medications. Overall, participants had a significant increase in the number of medications and the complexity of their medication regimen. Managing complicated regimens while engaging in therapy, making lifestyle changes, and coping with cognitive and / or physical impairments as a result of the stroke, is challenging for patient and their families. Using tools such as the AHCP can help patients manage a complicated medication regimen. One patient did not use the AHCP to assist with

learning and taking her medications. This patient had ten medication issues, could not describe her dietary restrictions, and had an ED visit.

The most concerning medication issue was the patient who was discharged without prescriptions for his statin, beta blocker and ACE inhibitor. This patient was hospitalized for his acute stroke at another facility and transferred to the study facility for his rehabilitation. The medication reconciliation completed on admission to the IRU was based on his discharge medications from the other acute facility, where those three medications had been initiated. When completing the discharge medication reconciliation, neither the physician nor nurse recognized that those medications were new and that the patient required prescriptions for them. The home health nurse recognized this on her visit and took steps to get medication prescriptions for the patient. The IRU staff was made aware of this problem to prevent medication reconciliation errors in the future.

An evaluation of the patients' knowledge about their medications revealed that special instructions, the reasons for taking the medications, and potential side effects offer the greatest opportunity for improvement. Despite teaching and reinforcement of medications and high use (87.5%) of the AHCP, participants achieved only 86% accuracy for medication knowledge. Opportunities for improvement in medication education are also reflected in the individual CTM 3 question, "When I left the hospital, I clearly understood the purpose for taking each of my medications," which scored 79. This score was lower than the overall hospital score of 83; the 28th percentile. These results will be used to promote ongoing process improvements to improve patient knowledge of their medications.

Safety issues.

Safety issues were identified for seven of eight participants. Those of greatest concern were with patients who use assistive devices and included: barriers to entry in the home (3), lack of mobility in the bathroom (1) and patient reports of unsteadiness (2). A listing of safety suggestions is included in the information given to patients on the IRU; very limited information is included in the patient educational materials for those discharged from acute care. With 75% of the patients having at least one identified

safety issue, there are opportunities to improve the safety education for families and patients in preparation for homegoing.

Readmission and use of the emergency department.

The results for readmission and use of the emergency department were disappointing, in that the readmission rate was higher than the hospital's historical readmission rate for stroke patients. The patients with the highest number of medication issues had the ED visit and the readmission, with ten and six issues respectively. The patient who had the ED visit also had five safety issues, the highest of all the participants. The higher number of medication issues may indicate that these patients were at risk for an unsuccessful transition. Further evaluation is necessary to determine if the number of medication and safety issues impacts successful transition. Identifying patients with a higher number of medication and safety issues may be useful as a mechanism to identify patients who are most at risk for an unsuccessful transition. Patients with a higher number of medication issues may benefit from an additional call or visit to confirm that the patient has addressed the identified issues, that they are taking their medications correctly, and that there environment is safe.

Intervention costs.

The cost for the either intervention is very reasonable when compared to the cost of a readmission to the hospital or an unexpected ED visit. The cost of the home visit is 50% more than that of the phone call. If a facility were to implement this project on a large scale, the increased cost would be significant if no additional benefit can be gained. It was postulated that the home visit would identify more medication and safety issues. In this small sample, there is no obvious difference in the findings between the two types of RN-led interventions. Further study to determine if there is an advantage to one method over the other is needed. The Home Health staff RNs were able to appropriately intervene for patients if they had an issue. For this small sample of patients, the skills of an advance practice nurse did not appear to be necessary. If an APRN were required, the costs would increase significantly.

Future implications.

This small feasibility study helped test the intervention and modify the tools and methods before implementation on a larger scale. The HH RNs requested minor modifications to wording in the script to clarify the side effect question and improve the flow of the interview. The exclusion criteria should be relaxed to allow patients discharged home with HH therapy to participate. The need to evaluate the patients based on the FIM ™ score is not necessary, as no patients were excluded from the study because of only a low FIM ™ score. Exclusions for patients discharged with Hospice and who live outside of the HH service area should be included. The time for gaining consent of IRU patients should be expanded. These patients could receive consent up to 96 hours before discharge, since their discharge time is set well in advance. This increase in time for the consent process would decrease the difficulty the CNS had in getting consents over the weekends and holidays.

The hospital where this study took place has identified the risk factors most commonly associated with readmissions at the facility. These patients can be identified as high risk in the electronic medical record and flagged for a detailed follow up phone call after discharge using the script piloted during this study. Registered nurses will place the calls to the patients identified as high risk as part of their normal work routine. Patients not identified as high risk will have a follow up phone call placed by a unit secretary using a shortened script, without the detailed medication reconciliation and safety assessment. Patients with questions, concerns or identified clinical needs will be referred to an RN on the unit for follow up.

Chapter 5

Project Summary

Every year over 795,000 people experience a stroke with an American having a stroke every 40 seconds (Roger et al., 2012). The individual experiencing the stroke is left to cope with the sequelae which can be, at minimum, disruptive to their lives, and often is devastating. These individuals must cope with a complex disease which impacts their quality of life. Improving the transition of the patient from the hospital to home can have a positive effect on the patient and their family.

Stroke patients have complex medical and social needs and are at risk for an ineffective transition of care (Olson et al., 2011). Successful transition of care can reduce avoidable readmissions. Nearly 20% of Medicare recipients discharged from the hospital was readmitted within 30 days of their index hospitalization (Jencks et al., 2009). Stroke patients are at increased risk of bounce-backs, a move to a higher level of care after discharge, with up to 20% of stroke patients experiencing a bounce-back. Patients who experience bounce-backs have a decreased chance of survival at one year after their stroke.

Multiple programs have been developed to assist in the transition of patients from hospital to home. They include the Re-Engineered Discharge Process (RED), Better Outcomes for Older Adults through Safe Transitions (BOOST), Hospital 2 Home (H2H), State Action on Avoidable Re-hospitalizations (STAAR) and the Care Transitions Intervention (CTI). These programs incorporate an enhanced assessment of post-hospital needs, effective teaching and enhanced learning, a post-hospital follow up plan and real-time handover information (Rutherford et al., 2011). Nurse led post-discharge interventions using phone calls or home visits have been undertaken with reports of improved patient satisfaction (Mistiaen & Poot, 2006; Turner, 1996). Decreased readmission rates and increased time to first readmission were demonstrated in a study led by APRNs (Naylor, Brooten, Campbell, Jacobsen, Mezey, Pauly, & Schwartz, 1999). Another study focusing on the emergency department also demonstrated decreased utilization of higher cost, higher acuity services with nurse led calls and home visits (Caplan et al., 2004).

The purpose of this proof-of-concept feasibility study was to determine if it is reasonable to evaluate two different staff nurse led models of post discharge care. No studies evaluating the effectiveness of phone calls in comparison to home visits have been undertaken using staff RNs as the care provider. The project randomized stroke patients discharged from acute care or inpatient rehabilitation to home, to receive either a home visit or a phone call as part an RN led post-discharge intervention. The effectiveness of the interventions was measured by the patient's satisfaction with the transition home as measured by the CTM-3, use of the emergency department or readmission within 30 days of discharge, and the number of medication issues and home safety issues identified.

The study took place in a 150 bed acute care hospital certified by The Joint Commission as a Primary Stroke Center that cares for approximately 120 stroke patients yearly. The study used the Clinical Scholar evidence based practice framework. This model promotes staff nurses integrating research into clinical practice; a goal of the organization where the project took place. The model moves the user through a series of sequential steps from problem identification through implementation and evaluation.

Using identified inclusion and exclusion criteria, acute stroke patients were screened to determine if they met the inclusion criteria and then asked to participate in the project. Participants were randomized to receive either a home visit or follow up phone call by a HH RN, between 24 and 96 hours after discharge. During the call or visit, a detailed medication reconciliation and patient safety assessment were completed using the same script for both interventions. Participants were asked about signs and symptoms of stroke, their individual risk factors, diet and activity. Follow up appointments and plans for transportation to the appointments were confirmed. Participants were then called between 30 and 35 days post discharge to assess if they had had a readmission or had visited an emergency department. During this call, the participants were asked about their satisfaction with transition using the CTM-3 tool.

The results identified that the participants had multiple risk factors for stroke at higher prevalence rates than in the overall population. These risk factors were: obesity, smoking rate, and uncontrolled hypertension. The participants had a significant increase in the number of medications they were taking

prior to admission and at discharge, with an increase of 131%. During the medication reconciliation patients were asked the name of their medications, strength, route, frequency, time of day, any special instructions, reason for the medication, and possible side effects. The results were tallied and demonstrated an overall percentage correct of 86%. Identified medication issues ranged from zero to ten with a mean of 3. The number of identified safety issues ranged from zero to five. The two patients with the highest number of identified medication issues had either a readmission to the hospital or used the emergency department.

This project demonstrates that, despite careful discharge planning with health literacy appropriate tools and a detailed AHCP, patients may still have medication issues and safety issues when they transition from hospital to home. These issues can lead to unanticipated re-hospitalization, use of the emergency department and decreased satisfaction. The facility where this project took place has taken significant steps to improve the transition of care for patients by implementing all of the components of Project RED with the exception of the follow-up call. Despite these steps, medication issues still occurred. For the study participants who had a post-hospital contact, issues were identified and the HH RN was able to intervene. This intervention may have prevented an untoward event. Implementing a phone call or home visit after discharge may help to decrease the need for re-hospitalization or use of the emergency department. A follow up contact with the hospital after discharge may also improve the patient's satisfaction with their transition. The project identified that there may be additional opportunities for improvement with patients who are identified as at-risk for readmission or use of the emergency department, based on the number of medication issues or safety issues they demonstrated at the call or visit. The patients in this small sample who were readmitted or used the ED had high numbers of medication and safety issues. Evaluating these issues with a larger number of patients may help to identify any correlation between medication and safety issues and an unsuccessful transition.

Although the number of participants was limited and no conclusions can be drawn regarding the superior benefit of either a call or home visit, the information gained will promote improvements in the facility where the project was conducted. Minor changes to the protocol will make it easier to screen

patients and complete the intervention. The project does demonstrate that conducting this study on a larger scale is feasible.

Limitations

Limitations of the project include the small number of participants and the inability to draw further conclusions regarding the effectiveness or advantages of either intervention. Failure to collect demographic information on the excluded patients was a missed opportunity to gain insight about factors affecting disposition decisions. The HH RNs were not asked to track or document the time they spent resolving issues for patients. This impacts the total cost of the intervention since the data is not fully complete without accounting for those costs. No arrangements were made to consult with one patient who was admitted and discharged over the weekend. Broadening the time range for consulting patients would ease the burden on the CNS who was responsible for consenting patients. Specifically, consulting patients earlier in their stay would decrease this burden.

Implications for nursing practice and to the DNP nurse executive.

This project demonstrates how critically important a successful transition of care is for the stroke patient and their family. Despite implementing an enhanced and standardized discharge process, patients still had gaps in their understanding of their medication regimen and unrecognized safety issues. The results demonstrate that additional mechanisms are needed to improve patient understanding of medications and identification and modification of safety issues in the home. The results informed us that our processes and educational information regarding medications and assessment of home safety were not adequate and can be improved.

The project demonstrated the effectiveness of the RED intervention and AHCP. Effectiveness was demonstrated by patients voicing that they had kept or intended to keep their follow up appointments. All patients referred to the plan during their call or visit and all of them knew why they had been in the hospital. Almost all participants could name all of the signs and symptoms of stroke and the majority knew all of their individual risk factors. The project demonstrated the effectiveness of this teaching and reference tool in helping stroke patients to transition safely and effectively.

This project demonstrated that a staff level RN can lead the post discharge care for patients and intervene appropriately to manage identified medication and safety issues in a low cost manner. The ability of a staff RN to implement the call or visit has implications for expanding this intervention to a wider group of patients. Using a staff level nurse to implement the intervention rather than an APRN is more feasible from a cost and access standpoint for many facilities. Testing of the script for the call and visit has lead to refinements in the script to make it more effective and easy to use on a widespread basis.

This project is an example of how the DNP prepared nurse executive can synthesize research from many different sources and on different topics into an intervention that affects the care and outcomes of patients. The DNP Essentials of scientific underpinnings for practice, quality improvement and systems thinking, and clinical scholarship and analytical methods for evidence based practice are strongly reflected in this project. The impact of the project on the DNP Essentials, is to further demonstrate the value of the eight essentials to improving care and outcomes for patients and adding to the scientific knowledge of nursing.

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